Personal Computer Hardware Reference Library

IBM Printer Adapter

6361507

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Description

The IBM Printer Adapter is specifically designed to attach printers with a parallel port-interface, but it can be used as a general input/output port for any device or application that matches its input/output capabilities. It has 12 TTL-buffer output points, which are latched and can be written and read under program control using the microprocessor In or Out instruction. The adapter also has five steady-state input points that may be read using the microprocessor's In instructions.

In addition, one input can also be used to create a microprocessor interrupt. This interrupt can be enabled and disabled under program control. A reset from the power-on circuit is also ORed with a program output point, allowing a device to receive a 'power-on reset' when the system unit's microprocessor is reset.

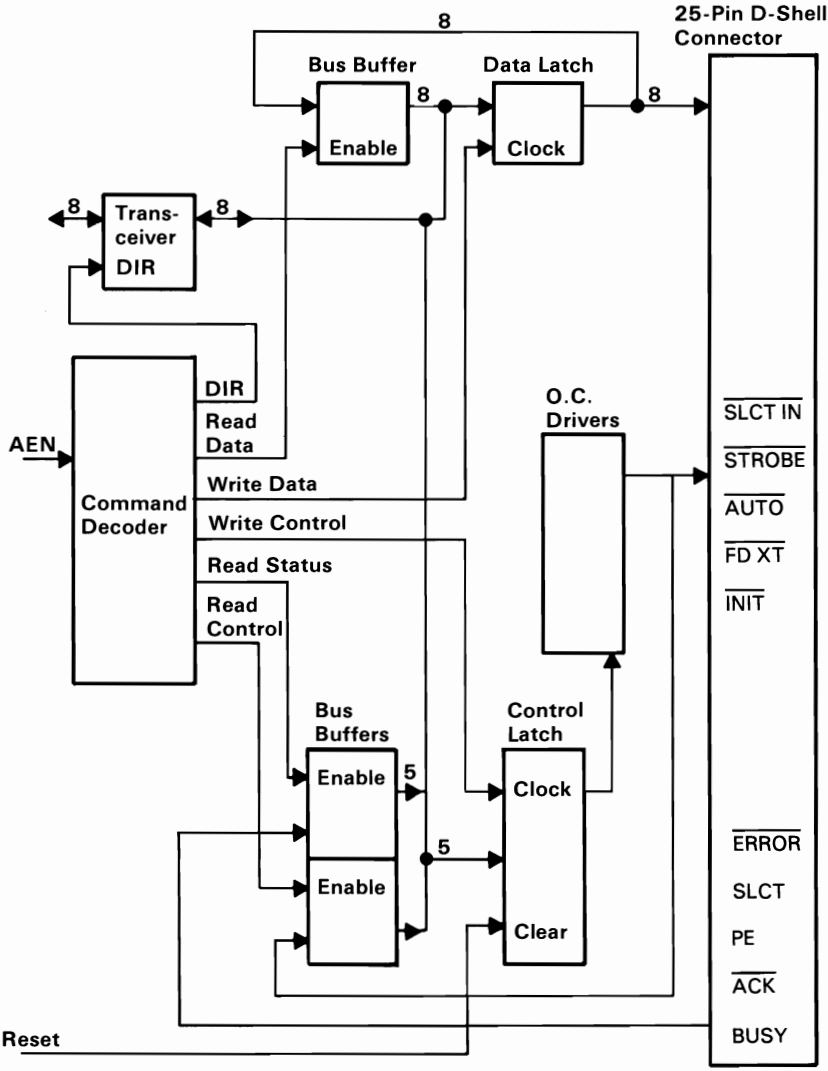
The input/output signals are made available at the back of the adapter through a right-angle, printed-circuit-board-mounted, 25-pin, D-shell connector. This connector protrudes through the rear panel of the system unit or expansion unit, where a cable may be attached.

When this adapter is used to attach a printer, data or printer commands are loaded into an 8-bit, latched, output port, and the strobe line is activated, writing data to the printer. The program then may read the input ports for printer status indicating when the next character can be written, or it may use the interrupt line to indicate "not busy" to the software.

The output ports may also be read at the card's interface for diagnostic loop functions. This allows faults to be isolated to the adapter or the attaching device.

This same function is also part of the IBM Monochrome Display and Printer Adapter.

The following is a block diagram of the Printer Adapter.



Printer Adapter Block Diagram

Programming Considerations

The Printer Adapter responds to five I/O instructions; two output and three input. The output instructions transfer data into two latches whose outputs are presented on pins of a 25-pin D-shell connector.

Two of the three input instructions allow the system unit's microprocessor to read back the contents of the two latches. The third allows the system unit's microprocessor to read the real-time status from a group of pins on the connector.

A description of each instruction follows.

Printer Adapter			
Output to address hex 378			
Bit 3 Pin 5	Bit 2 Pin 4	Bit 1 Pin 3	Bit 0 Pin 2

The instruction captures data from the data bus and is present on the respective pins. Each of these pins is capable of sourcing 2.6 mA and sinking 24 mA.

It is essential that the external device does not try to pull these lines to ground.

Printer Adapter			
Output to address hex 37A			
$\overline{\text{Bit 3}}$ Pin 17	Bit 2 Pin 16	$\overline{\text{Bit 1}}$ Pin 14	$\overline{\text{Bit 0}}$ Pin 1

This instruction causes the latch to capture the five least significant bits of the data bus. The four least significant bits present their outputs, or inverted versions of their outputs, to the

respective pins as shown in the previous figure. If bit 4 is written as a 1, the card will interrupt the system unit's microprocessor on the condition that pin 10 changes from high to low.

These pins are driven by open-collector drivers pulled to +5 Vdc through 4.7 kΩ resistors. They can each sink approximately 7 mA and maintain 0.8 volts down-level.

Printer Adapter
Input from address hex 378

This instruction presents the system unit's microprocessor with data present on the pins associated with the output to hex 3BC. This should normally reflect the exact value that was last written to hex 3BC. If an external device should be driving data on these pins at the time of an input (in violation of usage ground rules), this data will be ORed with the latch contents.

Printer Adapter
Input from address hex 379

This instruction presents the real-time status to the system unit's microprocessor from the pins, as follows.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Pin 11	Pin 10	Pin 12	Pin 13	Pin 15	—	—	—

Printer Adapter
Input from address hex 37A

This instruction causes the data present on pins 1, 14, 16, 17, and the IRQ bit to be read by the system unit's microprocessor. In the absence of external drive applied to these pins, data read by the system unit's microprocessor will match data last written to hex 3BE in the same bit positions. Notice that data bits 0–2 are not included. If external drivers are dotted to these pins, that data will be ORed with data applied to the pins by the hex 3BE latch.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
			IRQ Enable	$\overline{\text{Pin 17}}$	Pin 16	$\overline{\text{Pin 14}}$	$\overline{\text{Pin 1}}$
			Por = 0	Por = 1	Por = 0	Por = 1	Por = 1

These pins assume the states shown after a reset from the system unit's microprocessor.

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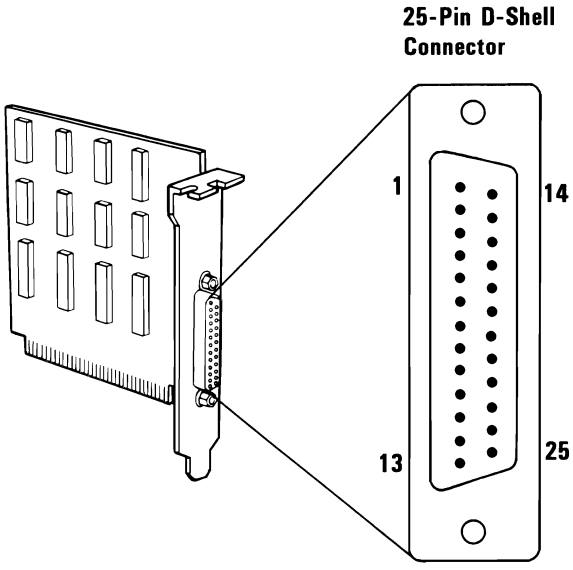
Specifications



At Standard TTL Levels

Signal Name	Adapter Pin Number	
– Strobe	1	
+ Data Bit 0	2	
+ Data Bit 1	3	
+ Data Bit 2	4	
+ Data Bit 3	5	
+ Data Bit 4	6	
+ Data Bit 5	7	
+ Data Bit 6	8	
+ Data Bit 7	9	Printer Adapter
– Acknowledge	10	
+ Busy	11	
+ P.End (out of paper)	12	
+ Select	13	
– Auto Feed	14	
– Error	15	
– Initialize Printer	16	
– Select Input	17	
Ground	18-25	

Printer

Connector Specifications

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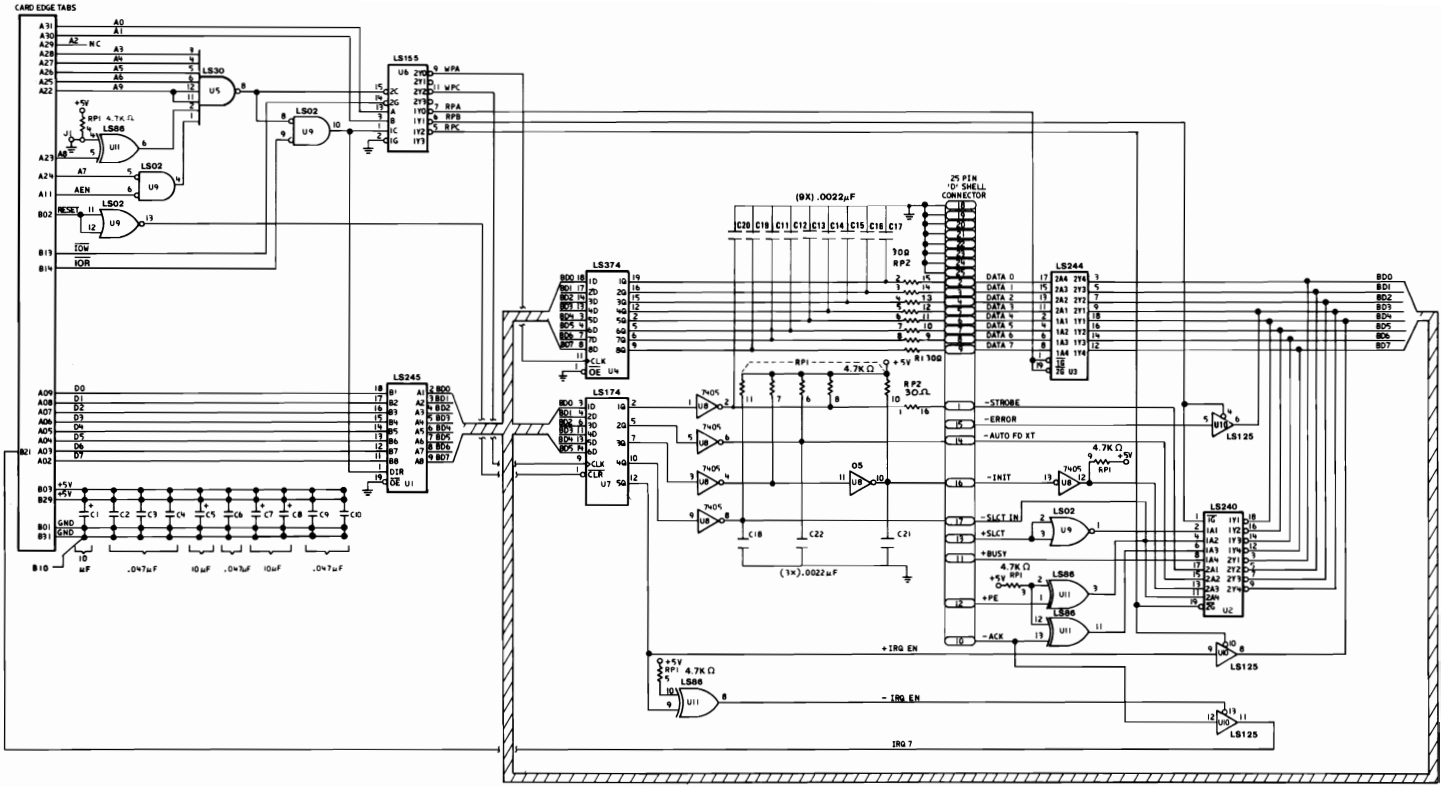
Logic Diagrams

The following page contains the logic diagram for the IBM Printer Adapter.



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